

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>047PCT 0844 GO/SH</b>	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. <b>PCT/EP2004/006670</b>	International filing date (day/month/year) <b>18.06.2004</b>	Priority date (day/month/year) <b>18.06.2003</b>
International Patent Classification (IPC) or national classification and IPC		
Applicant <b>REINZ-DICHTUNGS-GMBH</b>		

1.	This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of <u>6</u> sheets, including this cover sheet.
3.	This report is also accompanied by ANNEXES, comprising: <ul style="list-style-type: none"> <li>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows: <ul style="list-style-type: none"> <li><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> </li> <li>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</li> </ul>
4.	This report contains indications relating to the following items: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the report</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/006670

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_ which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-19 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. 1-21 \_\_\_\_\_ as originally filed/furnished
- nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- sheets 1/6-6/6 \_\_\_\_\_ as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/006670

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims <u>1-21</u>	YES
	Claims _____	NO
Inventive step (IS)	Claims <u>1-21</u>	YES
	Claims _____	NO
Industrial applicability (IA)	Claims <u>1-21</u>	YES
	Claims _____	NO

## 2. Citations and explanations (Rule 70.7)

**1. Prior art**

The following documents cited in the international search report are specified here for the first time; the same numbering will be used throughout the procedure:

D1: DE-C-101 58 772  
D2: WO-A-2004/036677 & DE-U-203 08 332  
D3: WO-A-03/044 886  
D4: WO-A-00/02 279  
D5: EP-A-0 620 609  
D6: DE-A-199 47 858  
D7: US-A-4 124 478

**2. Novelty**

2.1 Documents D1 and D2 are relevant only under **PCT Rules 33.1, 64.3 and 70.10** and are therefore not taken into consideration in this written report. If the subject matter of the application cannot in its totality claim the priority date of 18 June 2003, D1 and D2 will constitute, in a possible regional phase, relevant prior art for all parts of the application which cannot claim

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

the priority.

2.2 The claimed electrochemical arrangement (fuel cell, electrolyser, electrochemical compressor) differs from the cited prior art in that spring-elastic channels are provided in each bipolar plate (of the fuel cell) and fill the sealed space (10) described in D3 (*loc. cit.*; figure 1a; page 7, line 18 - page 8, line 2). The feature which establishes novelty, and which is mentioned by the applicant in the telefax of 26 July 2005, according to which "the distribution structure elastically yields in a controlled manner under a vertical pressure", is found in claim 1. The other citations describe further electrochemical arrangements (fuel cells) comprising bipolar plates and MEA. The requirements of **PCT Article 33(1) and 33(2)** therefore appear to be met.

### **3. Inventive step**

3.1 When assessing **inventive step (PCT Article 33(2) and 33(3))**, it is important to determine what is the technical **problem** addressed by the subject matter of the application, proceeding from the closest comparable prior art (**PCT Rule 5.1(a)(iii)**). In view of the above-mentioned structural differences, the **problem** with reference to the closest prior art (D3) consists in providing additional or alternative electrochemical arrangements with properties which cannot be derived from the prior art.

3.2 Document D3 describes an electrochemical arrangement for a fuel cell system which is very close to that

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according to the application. It relates to a "space sealed from its surroundings and in which various distribution structures are arranged". The essential difference is that the distribution structures in D3 fit the height of the space. It is known at least from D6 to arrange an intermediate layer between the bipolar plate and the electrode, the intermediate layer being firmly secured to the bipolar plate. Since it is also known from D8 to use channel structures advantageously for streams in layers or plates of electrochemical cells, it would be obvious to a person skilled in the art, when producing the electrochemical arrangement according to the application, that the presence of the materials according to the application (for example metals; see page 9, lines 8-13) would negatively affect the function as electrochemical arrangement. In this context, the presence of surprising effects in comparison with the electrochemical arrangement in the closest prior art could already be regarded as a sign of **inventive step (PCT Article 33(3))**. None of the citations contains any indication of the solution to this problem by means of the above-mentioned, novelty-establishing technical feature (modification of the static distribution structure).

3.3 The applicant has carried out **tests** in which "standard bipolar plates" were compared with those according to the present application ("bipolar plates with elastic properties") (see pages 17-19). This comparison is only significant if it relates to the technical feature which establishes novelty (see the paragraph above on novelty). It is pointed out, with

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respect to the **choice of closest comparable prior art**, that in the case of an invention which consists in modifying a known object in order to improve its known effect, the modifying feature must not only characterise the invention, i.e. differentiate it from the prior art, but also causally contribute to the improvement in the achieved effect. In the present case, therefore, bipolar plate arrangements which differ **exclusively by the novelty-establishing** technical feature should be compared. In these conditions, the comparative data submitted are sufficient for inventive step to be recognised (**PCT Article 33(3)**).

3.4 Only the embodiments of the electrochemical arrangement according to the invention which actually solve the problem addressed by the subject matter of the application, i.e. possess the surprising features mentioned, are patentable.

#### **4. Industrial applicability**

Insofar as the claimed electrochemical arrangements show advantages which cannot be derived from the prior art, no objections are raised in respect of industrial applicability (**PCT Article 33(4)**).